DOCUMENT RESUME

ED 159 010 SE 024 784

TITLE Diploma of Higher Studies in Oceanography. Red Sea & Gulf of Aden Programme (PERSGA).
INSTITUTION Arab Organization for Education and Science, Cairo (Egypt).
PUB DATE [76]
NOTE 18p.; For related documents, see SE 024 782-787; Contains occasional light and broken type

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS College Graduates; *Course Content; *Curriculum; *Environmental Education; Graduate Study; *Higher Education; *Oceanology; Professional Education; Science Education; Sciences; *Special Degree Programs
IDENTIFIERS Arab States; *Egypt

ABSTRACT

This document presents four courses for the diploma of higher studies in oceanography conducted by the Department of Oceanography, Faculty of Science, University of Alexandria, Egypt. These courses are organized by the Arab League Educational, Cultural and Scientific Organization (ALECSO). Each course is designed to be taught in one academic year (October to June). Candidates are required to hold a Bachelor of Science (B.S.) degree in one of the following basic sciences: (1) mathematics; (2) physics; (3) botany; (4) zoology; and (5) geology. The four specialization options are: (1) Physical Oceanography; (2) Chemical Oceanography; (3) Geological Oceanography; and (4) Biological Oceanography. The distribution of hours and details of the syllabus for each option are also presented. (Author/HM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

- ED159010

THE ARAB EDUCATIONAL CULTURAL
AND SCIENTIFIC ORGANIZATION

109, Tahrir Str. - Dokki-Cairo
A. R. Egypt.

Red Sea & Gulf of Aden Programme
PERSGA

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

E. M. Rifat

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

DIPLOMA OF HIGHER STUDIES
IN OCEANOGRAPHY

SE 024 784

DIPLOMA OF HIGHER STUDIES IN OCEANOGRAPHY

The courses for the diploma are conducted by the Department of oceanography, Faculty of Science, University of Alexandria, EGYPT.

The duration of the course is one academic year (October to June).

Candidates are required to hold a B.Sc. degree in one of the following basic sciences, "viz",

Mathematics

Physics

Botany

Zoology

Geology.

There are four specialisation options, viz.,

Group A : Physical Oceanography.
" B : emical Oceanography.
" C : Geological Oceanography.
" D : Biological Oceanography.

Group A : PHYSICAL OCEANOGRAPHY

1. Prerequisites : B.Sc., Physics or Mathematics.

2. Distribution of hours:

	Theoretical	Practical
Physical Oceanography	60	120
Dynamical "	60	60
Chemical "	30	60
Geological "	30	--
Regional "	30	--
Marine Meteorology	30	60
Marine Surveying & Cartography	30	30
General Oceanography	30	--
Limnology	30	--
Statistics	30	--
Total	360	330

3 - Details of Syllabus:

(B.Sc. graduates in Physics or Mathematics)

Physical Oceanograph:

(2 lects./ week)

Physical properties of sea water - observation in physical oceanography at sea - Distribution of temperature and salinity in the oceans. - Waves - Tides - Underwater photography - Radio - navigation - Underwater acoustics - Hydreoptics.

Practical :

(4 hrs.3 week).

Vertical and horizontal distribution of the physical properties of sea water - Protected and unprotected thermometers - Temperature and depth calculations - Determination of specific gravity using hydrometers - Determination of electrical conductivity of sea water - Analysis of data collected from field work.

Dynamical Oceanograph:

(2 lects./ week).

Basic dynamical theory - The hydrodynamic equations - Ocean currents and frictional forces - Thermodynamics of the ocean - Termohaline circulation - Estuarine circulation and nearshore processes - Dynamics of estuarics.

Practical:

Representation and processing of oceanographic data - Dynamical computations.

Chemical Oceanography : (1 lect./ week).

Salinity - Chlorinity and chlorosity - Constancy of composition of sea water - Elements present in sea water: major constituents & minor constituents.

Nutrients - Dissolved gases - Dissolved organic matter - Hydrogen ion concentration and alkalinity of sea water.

Practical: (2 hrs./week).

The quantitative determination of chlorides - The determination of chlorinity, salinity, dissolved oxygen, PH and alkalinity of sea water - Colorimetric determination of phosphates, nitrates and silicstes.

Geological oceanography: (1 lect./ week).

History and origin of ocean basins - Exploration of the ocean floor - Generalities of ocean basins - General terminology of submarine topography - Regions of the ocean floor - Submarine valleys and submarine canyons - Recent marine sediments.

Regional Oceanography : (1 lect./ week).

Bottom configuration of oceans and adjacent seas with special reference to the Mediterramean and Red seas - Distribution of variables in the oceans and their seasonal variations in relation to oceanic circulation.

Marine Meteorology: (1 lect./ week).

The earth's atmosphere - Meteorological elements - General distribution of weather - Some special winds - Air masses andtheir properties - Meteorological phenomena associoted with depressions and fronts - General idea about synoptic charts and weather forecasts.

Interaction between ocean and atmosphere: diffusion, mixing and turbulence.

Practical : (2 hrs./ week)

Meteorological instruments and interpretation of meteorological data.

Marine Surveying and Cartography: (1 lect./ week)

General navigation - Marine surveying - Tidal observations and techinques - Cartography.

Practical: (1 lect./ week).

Use of instruments of marine surveying and cartography.

General Oceanography: (1 lect./ week).

Classification of marine environments - Effect of environmental factors on the production and turnover of populations in the sea. Transfer of energy and elements in the food web - Effect of hydrographic and meteorological factors on fish behaviour and fisheries.

Limnology: (1 lect./ week).

Principles of limnology - Classification and types of lakes - Physical properties of lake waters - Chemistry of lake waters.

Statistiocs: (1 lect./ week)

Tabular and graphic presentation of data - Measures of central tendency - Measures of dispersion - Simple correlation Simple regression - Methods of estimation.

Group B: CHEMICAL OCEANOGRAPHY

1. Prerequisites: B.Sc., Chemistry.

2. Distribution of hours:

	Theoretical	Practical
Chemical Oceanography	120	240
Physical "	60	60
Geological "	30	--
Biological "	30	60
Marine Meteorology	15	30
Marine Surveying & Cartography	15	30
Regional Oceanography	30	--
Limnology	15	--
Statistics	15	--
Total	330	420

3. Details of Syllabus:

Chemical Oceanography: (4 lects./week).

Salinity, chlorinity and chlorosity of sea water - constancy of composition of sea water - Elements present in sea water, major and minor constituents: their occurrence, importance and extraction from sea water -

Dissolved gasses in sea water.
Hydrogen ion concentration - Alkalinity of sea water - Colorimetric analysis - Critical review of the determination of phosphate, nitrates, nitrites and silicates in sea water.

Geochemistry of sea water - Dynamics of nutrient salts.

Practical: (8 hrs/ week).

The quantitative determination of chlorides - Determination of chlorinity and salinity of sea water - The determination of dissolved oxygen, pH and alkalinity of sea water. Problems on the alkalinity of sea water and the computation of the different forms of carbon dioxide.

Colorimetric analysis of sea water - The determination of phosphates, nitrates, nitrites and silicates.

Physical Oceanography: (2 lects/ week).

Physical properties of sea water - Instruments used in physical oceanography - Distribution of salinity and temperature and factors controlling them - Waves, General considerations. Tides and tidal movements - Basic dynamical theory - Ocean currents.

Practical: (2 hrs./ week).

The protected and unprotected thermometers - Temperature and depth calculations - Tracing curves representing the vertical and horizontal distribution of physical properties of sea water.

Geological Oceanography: (1 lect./ week).

History and origin of ocean basins - Exploration of the ocean floor - Generalities of ocean basins - Nomenclature and classification of oceans and seas - General terminology of submarine topography - Regions of the ocean floor - Recent marine sediments - Corals and coral reef formation.

Biological Oceanography: (1 lect./week)

Classification of marine environments - Planktonic and benthic communities. Transfer of energy and elements in the food web - Systematic study of important marine plant and animal groups.

Practical: (2 hrs/week)

Laboratory studies of marine groups of plants and animals - Estimation of standing crop of plant and animal life.

Marine Meteorology: (1 lect./week for one term).

The earth's atmosphere - Meteorological elements - State of the seas - General distribution of weather - Air masses and their properties - General idea about synoptic charts and weather forecasts. Interaction between atmosphere and ocean.

Practical: (2 hrs/week for one term)

Meteorological instruments and interpretations of meteorological data.

Marine surveying and Cartography: (1 lect./week for one term)

Location of position at sea - Charts and hydrographic publications - Triangulation and base measurement - Map projections and construction of charts.

Practical: (2 hrs/ week for one term)

Use of instruments for marine survey and cartography.

Regional Oceanography: (1 lect./week)

Bottom configuration of oceans and adjacent seas with special reference to the Mediterranean and Red Seas. Water masses; their formation and circulation in the oceans.

Distribution of variables in the oceans and their seasonal variations in relation to oceanic circulation.

Limnology: (1 lect./week for one term)

Principles of limnology - Classification and types of

lakes - Physical properties of lake waters - Chemistry of lake waters.

Statistics: (1 lect./week for one term)

Tabular and graphic presentation of data - Measures of central tendency - Measures of dispersion - Simple correlation Simple regression - Methods of estimation.

Group C: GEOLOGICAL OCEANOGRAPHY

1. Prerequisites: B.Sc., Geology.

2. Distribution of hours:

	Theoretical	Practical
Geological Oceanography	90	180
Physical "	60	60
Chemical "	60	60
Regional "	30	--
Biological "	30	60
Marine Meteorology	15	30
Marine Surveying & Cartography	15	30
Limnology	15	--
Statistics	15	--
Total	330	420

3. Details of Syllabus:

Geological Oceanography: (3 lects./ week).

A) History and origin of ocean basins - Exploration of the ocean floor - Generalities of ocean basins - Nomenclature and classification of oceans and seas. General terminology of submarine topography - Regions of the ocean floor - Submarine valleys, shelf channels and submarine canyons - Recent marine sediments.

B) Marine environments of deposition - Geological importance of the sea, destructive and constructive processes - Coral reefs, types and formation.

C) Recent marine sediments: sources, transportation and deposition - Distribution of marine sediments - Depth ranges of pelagic sediments - Rate of sedimentation - Accumulation, deposition and distribution of calcium carbonate - Occurrence and activity of bacteria and organic content in marine sediments.

Practical: (6 hrs./week)

Techniques in sedimentary petrography - Mechanical analysis - Mineralogical analysis - Presentation of sedimentary data - Systematic study of Tertiary to Recent fauna - Methods of study of recent marine sediments, mechanical, minerological and chemical analysis - Biological investigations.

Physical Oceanography: (2 lects./week)

Physical properties of sea water - Instruments used in physical oceanography - Distribution of salinity and temperature and factors controlling them -

Waves general consideration -
Tides; and tidal movements; distribution, classification and prediction. Basic dynamical theory - Ocean currents - Circulation and shore processes.

Practical: (2 hrs./ week).

Protected and unprotected thermometers - Temperature and depth calculation - Tracing curves representing the vertical and horizontal distribution of physical properties of sea water - Calculation of the density in situ.

Chemical Oceanography: (2 lects./week)

Salinity, chlorinity - Constancy of composition of sea water - Major and minor constituents - Nutrients and their cycle in the sea. Dissolved gases and dissolved organic matter in sea water - Hydrogen ion concentration - Alkalinity - Carbon dioxide system in sea water - Geochemistry of sea water.

Practical : (2 hrs./week)

The determination of chlorinity and salinity of sea water - The determination of dissolved oxygen, pH and alkalinity of sea water. Colorimetric determination of phosphates, nitrates and silicates.

Regional Oceanography: (1 lect./week)

Bottom configuration of oceans and adjacent seas with special reference to the Mediterranean and R d seas. Water masses - Distribution of variables in the oceans and their seasonal variations in relation to oceanic circulation.

Biological Oceanography: (1 lect./week)

Classification of marine environments - study of planktonic and benthic communities - Systematic Study of organisms, particularly those contributing to shore formation and bottom deposits.

Practical: (2 hrs./ week)

Study of planktonic forms with special reference to local environments - Laboratory studies of marine groups of plants and animals - Contribution to shore formations and recent marine sediments.

Marine Meteorology: (1lect./week for one term)

The earth's atmosphere - Meteorological elements - General distribution of weather - Air masses and their properties - Depressions and fronts, formation and movement - General idea about synoptic charts and weather forecasts.

Interaction between atmosphere and ocean.

Practical: (2 hrs./week for one term)

Meteorological instruments and interpretation of meteorological data.

Marine Surveying and Cartography: (1 lect./week for one term)

Location of position at sea - Charts and hydrographic publications - The principle of triangulation and base measurement - Map projections and construction of charts.

Practical: (2 hrs./week for one term)

Use of instruments for marine survey and cartography.

Limnology: (1 lect./week)

Principles of limnology - Classification and types of lakes - Physical properties of lake water - Chemistry of lake waters - Lake sediments - Interaction between the bottom and overlying water.

Statistics: (1 lect./week for one term)

Tabular and graphic presentation of data - Measures of central tendency - Measures of dispersion - Simple correlation- Simple regression - Methods of estimation.

Group D: BIOLOGICAL OCEANOGRAPHY:

1. Prerequisites: B.Sc., Zoology or Batany.

2. Distribution of Hours:

	Theoretical	Practical
Biological Oceanography	90	120
Ichthiology	30	--
Fishery Biology & Management	30	120
Physical Oceanography	60	30
Chemical Oceanography	60	60
Geological Oceanography	30	--
Limnology	15	--
Statistics	15	--
Marine Meteorology	15	30
Marine Surveying & Cartography	15	30

3 - Details of Syllabus:

Biological Oceanography: (3 lects./week)

Historical introduction to oceanography - Development of the Science of Oceanography.-

Phytoplankton production and productivity:

Methods of culturing phytoplankton - Methods of estimating primary production including the C - 14 technique.

Zooplankton

Adaptation , Composition, Distribution & Behaviour - Zooplankton phytoplankton interrelationship - Methods of estimation.

Benthos

Classification and types of benthic habitats - Composition and characters - Different communities.

Marine Physiology

Respiration - Food and feeding - Osmo regulation - Bioluminescence of marine organisms - Reproduction and endocrines in fishes - Fish serology and behaviour of marine bacteria.

Practical: (4 hrs./week)

Studies on the structure and taxonomy of marine plants and animals - Representatives from local environments - Studies on plankton organisms - Phytoplankton culture.

Ichthiyology: (1 lect./week)

Outline of the morphology, anatomy and classification of fishes - Biology of fishes.

Fishery biology and management: (1 lect./week)

Population analysis and population dynamics - Fisheries management - Principle of fish culture - Egyptian fisheries - Fishing gears and methods.

Practical : (4 hrs./week)

Studies on the morphology, anatomy and taxonomy of egyptian fisnes.

Physical Oceanography: (2 lects./week)

a) Physical properties of sea water - Distribution of salinity and temperature and factors controlling them.
Waves, General consideration.
Tides : Tidal movements - Distribution - Classification and prediction.
Ocean currents.

b) Fisheries Hydrography: Effect of hydrographic and meteorological factors on fish behaviour and fisheries.

Practical: (1 hr./week)

The protected and unprotected thremometers - Temperature and depth calculation - Tracing curves representing the vertical and the horizontal distribution of physical properties of sea water - Calculation of the density in situ.

Chemical Oceanography: (2 lects./week)

Elements present in sea water, major and minor constituents. Nutrients and their cycles in the sea - Dissolved gases and dissolved organic matter in sea water - Hydrogen ion concentration - Alkalinity - Theortical treatment of the carbon dioxide system in sea water - Dynamics of nutrient salts - Critical review of the determination of phosphates, nitrates, nitrites and silicates in sea water.

Practical: (2 hrs./week)

The quantitative determination of chlorides - The determination of chlorinity, dissolved oxygen, pH and alkalinity of sea water. Colourimetric determination of phosphates, nitrates and silicates.

Geological Oceanography: (1 lect./ week)

History and origin of ocean basins - Exploration of the ocean floor - Generalities of ocean basins - Nomenclature and classification of oceans and seas - General terminology of

submarine topography - Regions of the ocean floor - Recent marine sediments - Coral reef, types and formation.

Limnology: (1 lect./week for one term)

Tabular and graphic presentation of data - Measures of central tendency - Measures of dispersion - Simple correlation - Simple regression - Methods of estimation .

Marine Meteorology: (1 lect./week for one term)

The earth's atmosphere - Meteorological elements - States of the sea - General distribution of weather - Air masses and their properties - Depressions and fronts - General idea about synoptic charts and weather forecasts. Interaction between atmosphere and ocean.

Practical: (2 hrs./week for one term)

Meteorological instruments and interpretation of meteorological data.

Marine Surveying and Cartography: (1 lect./week for one term)

Location of position at sea - Charts and hydrographic publications - The principle of triangulation and base measurement - Map Projections and construction of charts.

Practical: (2 hrs./week for one term)

Use of instruments for marine survey and cartography.

N.B. Students have to attend a field training course for three weeks during summer as arranged by the Department.